UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The list of the scholarships awarded at the twelve larger colleges was issued last Saturday. Excluding exhibitions, sizarships, and subsizarships, the amounts of which are uncertain and the number in many cases undetermined, the amount given away in the twelve colleges amounts to 5430*l.* The seven colleges, Pembroke, Caius, King's, Jesus, Christ's, St. John's, and Emmanuel, gave away sixty scholarships of a total value of 3380*l.*; whilst the Trinity group, consisting of Trinity, Clare, Trinity Hall, Peterhouse, and Sidney, gave away 2500*l.* for thirty-seven scholarships.

The total amount in the former group given for classics is 1560*l.*, for mathematics 1000*l.*, and for natural sciences 620*l.*, the number of scholarships being:—in classics twenty-six, in mathematics seventeen, and in science twelve. The proportion of science to the other subjects is better in the group of five colleges, for their science scholarships numbered ten of a value of 560*l.*, as opposed to sixteen scholarships in classics the total value of which amounted to 880*l.* We have left out of account the comparatively small sum of 340*l.* which was given for history, Hebrew, and modern languages.

DR. H. A. WILSON, senior lecturer in physics at King's College, London, has been appointed professor of physics at the college in succession to Prof. W. G. Adams, who resigned last July.

REUTER'S correspondent at Tokio reports that the resignation of the Japanese Minister of Education has been accepted, and the differences between the university and the Government have thus apparently been settled. Count Katsura, the Premier, has taken the portfolio of education, while retaining the Premiership. The resignations tendered by the professors have not been accepted.

IN a paper read at the American Mining Congress at El Paso, Texas, on November 14, Mr. V. C. Alderson, president of the Colorado School of Mines, urged mining schools to go beyond mere instruction and to enter the field of research. There was not at present, to his knowledge, a mining school in the United States which had a department of research in good working order. There should, he considered, be such a department at a State mining school to work in conjunction with the State Bureau of Mines.

MR. E. ROBINSON, of Boncath, opened a discussion on the question of the establishment of a school of forestry for Wales at the annual meeting of the agricultural society of the university college at Aberystwyth. He said that, if the seven Welsh counties affiliated to the college would vote on an average 300*l.* each and give an annual subsidy of 100*l.* each for eight years, the proposed school of forestry after that period could easily be made self-supporting. The Government, he urged, must come forward to second the efforts of the county councils by advancing money to landowners at a reasonable rate of interest. Mr. J. Herbert Lewis, M.P., said that the question of afforestation is rapidly becoming one of national concern. A departmental committee has made it clear that a shortage in the world's supply of timber may be looked for in the near future, and that millions of acres of waste land in the United Kingdom are suitable for afforesting. Our large municipalities could do much, following the example of the Liverpool Corporation at Vyrnwy, by afforesting the catchment areas of their waterworks.

SCARCELY a week passes without the announcement of substantial gifts to one or other of the universities of the United States. In addition to those mentioned in NATURE of last week, *Science* announces the following donations:—Mrs. Phoebe Hearst has presented to the California State University her archæological and anthropological collection from all parts of the world. It has cost more than 80,000*l.*, and with it she presents to the university 12,000*l.* for the maintenance of a department of anthropology. Hope College, Holland, Mich., recently received 20,000*l.* from Mr. Ralph Vorhees, of Clinton, N.J. A new chemistry hall has been erected for the university of North Carolina by a legislative appropriation of 10,000*l.* Mrs. Clara C. Jacobus has given 5000*l.* to found a fellowship at Princeton University, to be conferred on the graduate student who has reached the highest excellence in his work during the previous year. An anonymous donor has given 2000*l.* to establish a fellowship in chemistry. Mr. Henry B. Loomis has given 2000*l.* to the scientific school of Yale University to establish a fellowship in chemistry.

THE council of the Association of Technical Institutions has issued a report of an inquiry as to the cooperation of employers and technical institutions. A form of inquiry was sent to each of the sixty-five institutions affiliated to the association, to technical institutions and university colleges not thus affiliated, and to some of the large employers of labour whose educational work with their employees was not likely to be connected with the various technical institutions already approached. The answers received to the questions asked on the form of inquiry are analysed under several headings, among which may be mentioned the trades to which the scheme of cooperation applies, the number of students affected by the scheme, the payment of class fees, the provision of books, and leave of absence to attend classes. The report, in its summary of the results of the inquiry, states that if regarded from the point of view of how few of the army of masters appear to interest themselves at all in the technical education of their workers, the record cannot be other than disappointing, especially in view of the different attitude of employers on the Continent and in the United States. On the other hand, if looked at in comparison with the attitude of employers ten years ago, the result is most hopeful. It is interesting in this connection to note that in distributing prizes to the students of the Gateshead higher evening classes, Sir Isambard Owen suggested that it would pay employers to enable their apprentices to work shorter hours by day on condition that they availed themselves of the opportunities for evening instruction. Continuing, he said the great desire of the Plumbers' Company is now to adopt measures for advancing the apprenticeship system, in view of the indisposition of employers, who are keenly competing with each other to obtain plumbing work at a profit, to burden themselves with apprentices, thus ignoring the importance of training the coming generation of plumbers. This pressure of commercial interests over the craftsman spirit constitutes a serious menace to efficiency, not only in the plumbing trade, but in other skilled industries.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, November 16.—"The Physical and Chemical Properties of Iron Carbonyl." By Sir James **Dewar** and H. O. **Jones.**

The paper contains an account of a study of the properties of iron pentacarbonyl, which has been carried out on the same lines as the previously published investigation on nickel carbonyl. Attention has been directed more particularly to the differences between the iron and nickel carbonyls, such as the difference in formulæ $Fe(CO)_5$ and $Ni(CO)_4$, colour (the iron compound is yellow and the nickel compound is colourless, whereas the salts of the latter metal usually show a much more marked colour than those of the former), and stability, and to the action of light on iron carbonyl.

Pure iron carbonyl is a yellow liquid, which boils at $102^\circ \cdot 5$ C. and freezes at -20° C. to a yellow solid, which becomes colourless at -180° C. Analysis, vapour density determinations, and molecular weight determinations by the cryoscopic method in benzene show that its formula is $Fe(CO)_5$.

The specific gravity of the compound is 1·4937 at 0° C. and 1·3825 at 60° C.; its critical temperature is 288° C.

The formula $v = 1 \cdot 974 - 0 \cdot 5307 \, (\log 288 - t)$ expresses the relation between the volume of the liquid v and the temperature t° C.

The relation between the vapour pressure p in millimetres of mercury and the absolute temperature T is expressed by the Rankine formula $\log p = 7 \cdot 349 - 1681/T$.

The critical pressure is calculated to be 29·6 atmospheres, and the critical density 0·49.

The value $\frac{\text{abs. critical temperature}}{\text{critical pressure}}$ is 18·9; this is proportional to the volume of the molecule, and is equal to 5·1 times the corresponding number for carbon monoxide (3·7). The molecular volume of iron carbonyl at its boiling point is 150, so that, taking 7·0 as the volume of the iron atom, 28·6 is the volume of each carbon monoxide group. The molecular volume of carbon monoxide at its boiling point is 35, therefore a greater contraction would occur in the formation of iron carbonyl from liquid carbon monoxide and iron than in the formation of nickel carbonyl under similar conditions.

Vapour density determinations by V. Meyer's method in carbon monoxide, nitrogen, and hydrogen at different temperatures show the effect of increase of temperature and the rapid diffusion of hydrogen in increasing, and of carbon monoxide in diminishing, the dissociation.

The chemical reactions of iron carbonyl are very similar to those of nickel carbonyl, but its stability is greater. Chlorine, bromine, iodine, their compounds with one another and their hydrides react with iron carbonyl giving *ferrous* salts and carbon monoxide; the reaction with bromine takes place more slowly than that between iodine and nickel carbonyl. Neither sulphur nor nitric oxide reacts with iron carbonyl, whereas both react readily with nickel carbonyl. Sulphuric acid, on the other hand, decomposes iron carbonyl more readily than it does nickel carbonyl.

Benzene in presence of aluminium chloride reacts with iron carbonyl, with cold to give benzaldehyde, and at 100° C. to give anthracene, exactly as with nickel carbonyl.

Iron pentacarbonyl alone or in solution in ordinary organic solvents is decomposed by sunlight according to the following equation, $2Fe(CO)_5 = Fe_2(CO)_9 + CO$. The second compound of iron and carbon monoxide is deposited as an orange, crystalline solid from most solvents, but is retained in solution by pyridine. The reaction takes place rapidly under pressures of carbon monoxide up to 150 atmospheres, and yet is very slowly reversed in the dark under small pressures of carbon monoxide. This decomposition takes place slowly at the temperature of liquid air, but if the iron pentacarbonyl or its solutions be heated to any temperature above 60° C., then no solid is deposited and no decomposition occurs. Solutions of iron carbonyl in nickel carbonyl at the ordinary temperature undergo no decomposition and no solid is formed unless the solution contains more than 30 per cent. of the iron carbonyl, when some solid is formed. These solutions are of a much lighter colour than solutions of equal concentration in other solvents, and it is suggested that the two carbonyls may unite to form a compound which is unaffected by light.

The solid iron carbonyl forms lustrous hexagonal plates having a specific gravity of 2·085; its molecular volume is therefore 174.

The solid iron carbonyl when heated alone decomposes at 100° C. into carbon monoxide, liquid iron carbonyl, which is coloured green, and iron; when heated with carbon monoxide under pressure it is completely converted into liquid iron pentacarbonyl.

If the solid iron carbonyl be heated with a solvent such as ether or toluene, a solution of an intense green colour is produced; this green solution on exposure to light deposits the yellow, crystalline, solid carbonyl again. The change from solid to green solution and back again can be repeated indefinitely by the action of heat and light alternately.

Zoological Society, November 28.—Dr. Henry Woodward, F.R.S., vice-president, in the chair.—*Exhibitions.*—Photographs of a horse bearing incipient horns: J. T. **Cunningham.** The horns were about $\frac{3}{4}$-inch in length, the left being slightly larger than the right, and there could be no doubt that they were outgrowths of the frontal bone. The growths were covered with normal skin and hair.—Photographs, taken in the Horniman Museum at Forest Hill, of a sea-anemone (*Anemonia sulcata*) in the process of division: F. **Slade.**—A living albino specimen of the field-vole (*Microtus agrestis*) captured last July in Wales: D. **English.**—A living lizard, *Lacerta muralis*, from Brozzi, province Florence, received from Dr. A. Banchi: G. A. **Boulenger,** F.R.S. The lizard belonged to the typical form of the wall-lizard, but was remarkable for its black coloration above and below. Melanistic forms of the wall-lizard were well known on small islands in the Mediterranean, but, so far as Mr. Boulenger was aware, no black specimen had ever been recorded from the mainland. The scales across the body numbered fifty-eight, and the lamellar scales under the fourth toe twenty-five in the specimen exhibited, these two numbers being sufficient to distinguish the Brozzi lizard from the melanotic insulars previously described.—A living specimen of the violet-cheeked humming-bird (*Petasophora iolota*) brought from Venezuela and presented to the society's menagerie: Captain A. **Pam.** A general account of the habits of these birds, as observed by Captain Pam, in a wild and captive state, and notes on their management and feeding while in confinement.—A named set of the birds collected in Japan by Mr. M. P. Anderson in connection with the Duke of Bedford's exploration in eastern Asia: W. R. **Ogilvie-Grant.** No new species were obtained, but several of the specimens were of special interest as illustrating stages of plumage not represented in the British Museum. —*Papers.*—A transition in the general type of colouring from the wholly black *Colobus guereza* in one direction, through several intermediate forms, towards the black and white *C. caudatus*, and in another direction towards *C. vellerosus*: R. **Lydekker.**—A mounted specimen of the white-maned serow (*Nemorhaedus argyrochaetes*, Heude), of Szechuen, the first example of the species ever received in England, and perhaps in Europe: R. **Lydekker.**—Mammals collected in Japan by Mr. M. P. Anderson for the Duke of Bedford, and presented by the latter to the National Museum: O. **Thomas.** The collection was one of the most valuable for scientific purposes which had ever been received from any one region. More than 600 specimens had been obtained, belonging to 50 species and subspecies, of which several were described as new.—A revision of the fishes of the family Galaxiidæ: C. T. **Regan.** Two genera were recognised, Galaxias and Neochanna, the latter consisting of a single species only. Twenty-eight species of Galaxias were described, including *G. attenuatus*, Jenyns, found on the coasts and in the rivers of Australia, New Zealand and Chili, Patagonia, and the Falkland Islands, and two peculiar to the Cape of Good Hope, five to New Zealand and the neighbouring islands, five to Chili, Patagonia, and the Falkland Islands, and fifteen to Australia and Tasmania. Five species were described as new to science. —The mammalian fauna of China. First paper: J. L. **Bonhote.** The present part dealt with the Murinæ, containing the genera Mus and Micromys, giving descriptions and synonymy, as well as emphasising the distinctive characters by which the various species might be easily distinguished.—Some additions to the knowledge of the anatomy, principally of the vascular system, of Hatteria, Crocodilus, and certain Lacertilia: F. E. **Beddard.**—Descriptions of 111 new species of phytophagous Coleoptera of the family Halticidæ: M. **Jacoby.**

Chemical Society, December 7.—Prof. R. Meldola, F.R.S., president, in the chair.—The constitution of nitrites, part i., two varieties of silver nitrite: P. C. **Rây** and A. C. **Gañguli.** The α variety of silver nitrite is prepared by double decomposition between solutions of silver nitrate and sodium nitrite. The β variety is obtained by dissolving the α variety in boiling water, and from the hot saturated solution the nitrite is allowed to crystallise. The two forms show differences in crystalline structure and mode of decomposition by heat.—The products of heating silver nitrite: E. **Divers.** The author, while accepting Rây and Gañguli's experimental data, dissents from the view that these are two forms of silver nitrite.—A contribution to the chemistry of benzoic sulphinide: F. D. **Chattaway.** When chlorine is passed into a solution of the sodium salt of saccharin, *o*-benzoic *N*-chlorosulphinide or chloroiminosaccharin is precipitated. An account of the properties of this substance is given.—The action of heat on α-hydroxycarboxylic acids, part ii., α-hydroxymargaric acid, α-hydroxypalmitic acid, α-hydroxypentadecylic acid, and α-hydroxymyristic acid: H. R. **Le Sueur.** The aldehydes obtained by the pyrogenetic decomposition of these acids are white solids, readily soluble in the ordinary organic solvents; they form oximes, semicarbazones, hydroxycyanides, and are oxidised to the corresponding acids.—Studies on optically active carbimides, part ii., the reactions between *l*-menthylcarbimide and alcohols: R. H. **Pickard,** W. O. **Littlebury,** and A. **Neville.** *l*-Menthylcarbimide reacts readily with alcohols, and fourteen of the latter have been shown to yield *l*-menthylcarbamates. These reactions have been studied polarimetrically, and the velocity constants of reaction so obtained compared.—The liberation of tyrosine during tryptic proteolysis. A preliminary communication: A. J. **Brown** and E. T. **Millar.** The authors have applied Millar's method of estimating tyrosine by means of bromination to the study of the tryptic hydrolysis of proteids, and find that tyrosine is one of the first products of such action. The quantitative study of proteolysis in this way may throw some light on the existence or non-existence of a tyrosine nucleus in different albuminoses.—Ethyl piperonylacetate: W. H. **Perkin,** jun., and R. **Robinson.** A description of the preparation of this ester from piperonylic acid.—The action of ultra-violet light on moist and dried mixtures of carbon monoxide and oxygen: S. **Chadwick,** J. E. **Ramsbottom,** and D. L. **Chapman.** It was found that under the action of the rays emitted from a quartz mercury lamp a dry mixture of these gases was largely, but somewhat irregularly, converted into carbon dioxide and ozone. With *moist* gases the rate of conversion was slower and more uniform, and more carbon dioxide was formed and less ozone.—Benzoyl derivatives of salicylamide: A. W. **Titherley.**—The constitution and colour of diazo- and azo-compounds: A. **Hantzsch.** A criticism of Armstrong and Robertson's paper, "The Significance of Optical Properties as Connoting Structure" (*Journ. Chem. Soc.*, 1905, 1272–1297).—Note on the incandescent mantle as a catalyst and its application to gas analysis: J. E. **Mason** and J. **Wilson.** The authors describe a modification of Lewes's method (*Chem. News*, 1905, xci., 61) for showing the incandescence of the mantle in an unburnt mixture of alcohol vapour and air. Although less effective, the mantle may be used as a substitute for platinised asbestos in the ordinary lecture experiments for preparing formaldehyde from methyl alcohol vapour and air, and sulphur trioxide from sulphur dioxide and oxygen, and various applications of mantle fragments to the analysis of mixtures of hydrocarbon gases by combustion are given.—The influence of certain amphoteric electrolytes on amylolytic action: J. S. **Ford** and J. M. **Guthrie.** The results of an investigation of the influence of various amino acids on amylolytic action are given.—The estimation of picric acid additive compounds: F. S. **Sinnatt.** The method of Knecht and Hibbert (*Ber.*, 1903, xxxvi., 1549) for the estimation of picric acid by means of titanous chloride has been found to be applicable to picrates and to picric acid additive compounds.—Silver dioxide and silver peroxynitrate: E. R. **Watson.** The author has analysed the anodic product formed during the electrolysis of solutions of silver nitrate, and finds that its composition was correctly represented by Sûlc's empirical formula $Ag_7O_{11}N$. This compound on boiling with water decomposes, forming silver dioxide, a greyish-black powder which may be heated to 100° without decomposition.—The constitution of *o*-hydroxyazo-compounds. Preparation of benzeneazodimethylcoumarin: J. T. **Hewitt** and H. V. **Mitchell.**—Caro's permonosulphuric acid: T. S. **Price.** The author has obtained a mixture containing the potassium salts of sulphuric, permonosulphuric, and perdisulphuric acids. The results obtained by the analysis of this mixture point to the formula H_2SO_5 for Caro's acid.

Royal Astronomical Society, December 8.—Mr. W. H. Maw, president, in the chair.—Account of the results of his recent investigations relating to sun-spot periods: Prof. A. **Schuster.** Besides the recognised 11- or $11\frac{1}{4}$-year period, the author found various subsidiary periods which recur with great regularity, but which sometimes disappear. A period of about $4\frac{3}{4}$ years could be traced back to 1749, and other periods of about $8\frac{1}{2}$ and 13 years were also indicated. Possible explanations of the peculiarities of these periods were suggested.—On the astronomical observations recorded in the Nihongi, the ancient chronicle of Japan: E. B. **Knobel.** The astronomical observations contained in this work comprise eclipses of sun and moon, occultations, conjunctions, comets, meteors, &c., and range from A.D. 620 to A.D. 696. There is great difficulty in fixing the dates of the observations owing to the complicated system of chronology, borrowed from China. The year is a lunar one of twelve months of twenty-nine or thirty days, and an intercalary month every thirty-third month, or seven intercalary months in the lunar cycle of nineteen years. The rules for intercalary months are very complicated, and there is therefore much difficulty in reducing the dates to European chronology. Most of the recorded eclipses agree with Oppolzer's tables when the dates are properly reduced.—On the present state of lunar nomenclature: S. A. **Saunder.** The paper showed the anomalies and irregularities in the present system, resulting in difficulculties of identification in the case of many of the smaller features on the moon which had been selected as points for exact measurement. It was suggested that a committee should be formed to revise the present system of lunar nomenclature.—Photographs of comet *d* 1905 taken with the 30-inch reflector of the Royal Observatory, Greenwich, shown by Prof. F. W. **Dyson.**—Comparison of the results from the Falmouth declination and horizontal force magnetographs on quiet days in years of sun-spot maximum and minimum: Dr. C. **Chree,** F.R.S.—The president announced that the Rev. C. D. P. Davies was giving a demonstration of his system of testing parabolic mirrors.—Other papers were taken as read.

Mathematical Society, December 14.—Prof. A. R. Forsyth, president, in the chair.—Some difficulties in the theory of transfinite numbers and order types: the Hon. B. A. W. **Russell.** The paper deals with the difficulty as to "inconsistent aggregates" and with the question concerning the axiom that every aggregate can be well ordered. It is shown that the difficulties belong rather to logic than to mathematics, and various methods are explained by which steps may be taken towards resolving them.—On well-ordered aggregates: Prof. A. C. **Dixon.**—The Hessian configuration and its connection with the group of 360 plane collineations: Prof. W. **Burnside.** The configuration is that of 9 points in a plane which lie 3 by 3 on 12 straight lines. The first part of the paper is occupied with the establishment of the configuration, and of the nature of the group for which it is invariant, from a geometrical point of view. In the second part it is shown how to construct a configuration of 45 points which lie 5 by 5 on 36 lines, 4 by 4 on 45 lines, and 3 by 3 on 120 lines. From the 45 points 10 Hessian configurations can be formed, and any two of these have one point in common. The configuration is invariant for a group of 360 collineations, which is simply isomorphic with the alternating group on six symbols.—On the representation of certain asymptotic series as convergent continued fractions: Prof. L. J. **Rogers.** The paper is concerned with asymptotic series which represent integrals of the type $\int_0^\infty f(t)e^{-t/x}dt$, where $f(t)$ is a polynomial or is representable by a power series.—The theory of integral equations: H. **Bateman.** The theory is that of the construction of a function ϕ which shall satisfy an equation of one of the forms

$$(1)\quad f(x)=\int_a^b \kappa(x,\,t)\phi(t)dt,$$

$$(2)\quad f(x)=\phi(x)-\lambda\int_a^b \kappa(x,\,t)\phi(t)dt,$$

where f and κ denote known functions and λ is a constant. It is shown how to reduce the solution of a linear differential equation to an integral equation of the second type, and that, if is discontinuous in a certain way, a solution of the equation of the first type exists and can be determined.—The imaginary in geometry: J. L. S. **Hatton.**—On a new cubic connected with the triangle: H. L. **Trachtenberg.**

Anthropological Institute, November 21.—*Exhibitions.*—Collection of photographs from Arizona: J. S. **Chase.** These included typical types of the natives, and also illustrated the Mogui snake dance and other ceremonies.—Collection of objects from Siam, including weapons, pottery, and musical instruments: M. **Bidder.**—*Paper.*—Boomerangs: N. W. **Thomas.** The author explained the difference between the return and non-return boomerang, and showed the reasons for the peculiarity of the former kind. Diagrams of the different flights were exhibited, as well as a large collection of Australian boomerangs and African throwing knives.

CAMBRIDGE.

Philosophical Society, November 13.—Prof. Liveing in the chair.—Polarisation phenomena at Guelma in the eclipse 1905 August 30: H. F. **Newall,** F.R.S. The visual observations combined with the photographic records proved that the plane of polarisation of the light diffused by the earth's atmosphere during the eclipse was very nearly horizontal. Photographic records, obtained with a Savart polariscopic camera for the purpose of quantitative measurements of the relative amounts of polarised and unpolarised light in the corona, showed that the polarised portion of the atmospheric light was equal in intensity to the radially polarised portion of the coronal light at a distance of about $1\frac{1}{2}$ diameters from the sun's limb. Thus the phenomena of a radially polarised corona seen through a plane polarised atmosphere are somewhat complicated. The results obtained by photographing the corona through a large Nicol prism, which was set to transmit successively the vertical component and two components which were inclined on each side at 45° to the vertical and consequently perpendicular to one another, not only show the strong radial character of the polarisation of the corona, but also seem to suggest that there is a selective action, and that the prominent streamers of the corona are markedly polarised. A photograph taken with a new form of polarising spectrograph shows a very marked difference in the intensities of the tangential and radial components; but a curious feature in it is that the Fraunhofer lines are not detected in either spectrum, though the conditions are such as must be regarded as very favourable for their detection.—Suggestions for a theory of the Milky Way and the clouds of Magellan: A. R. **Hinks.**—The effect of the lunar deflection of the vertical on latitude observations: B. **Cookson.** The attraction of the moon would cause the plumb-line to be deflected through an angle of $0''.02$ at a maximum, if the earth were a rigid body. It is pointed out that observations made for the purpose of determining the constant of aberration and variation of latitude by Küstner's method are suitably arranged for showing this deflection. A series of observations made at Philadelphia is discussed, but fails to show the direct lunar effect, though it shows an oscillation with a period of half a lunar day, which may be due to the attraction of the ocean tides.

November 27.—Prof. Marshall Ward, president, in the chair.—Some experiments on Canal-strahlen: Prof. **Thomson.** Experiments were described showing that when the stream of positive ions which form the Canal-strahlen fall on a solid, slowly moving kathode rays start from the part of the solid struck by the positive ions; again, metals struck by the Canal-strahlen disintegrate, and the metal is deposited on the walls of the discharge tube; ionisation was shown to accompany the passage of the Canal-strahlen. It is suggested that the reason the α particles of radium lose, as shown by Rutherford, their power of ionisation when their energy falls to a value which, though less than the initial energy possessed by the α particles, is enormously greater than the positive ions in the Canal-strahlen, may be that the α particles lose their charge when their velocity falls below a certain value by combining with a negative corpuscle; the value of this velocity is calculated, and it was shown to be between 10^8 and 10^9 cm.-sec. The spectra produced by Canal-strahlen were discussed, and it was shown that though these rays give rise to the sodium lines when they fall upon sodium salts, they do not do so when they fall upon the pure metal.—Experiments on the retention of an electric charge by gases: W. A. D. **Rudge.**—The effect of hydrogen on the discharge of electricity from hot platinum: O. W. **Richardson.** An account of experiments on the ionisation produced by a platinum tube in air when hydrogen was allowed to diffuse from inside the tube. The negative ionisation was unaffected, whereas the positive was increased by an amount proportional to the quantity of hydrogen diffusing through. The experiments indicate that the increase in the negative leak produced by an atmosphere of hydrogen is due to a change produced by the latter in the surface of the metal, possibly by the formation of an electrical double layer. The experiments on the positive ionisation tend to show that the hydrogen dissolved in the metal is in the form of positive ions.—On colour-inheritance in rats: L. **Doncaster.** Among the varieties of domestic rats there are, in addition to albinos, two types of colour, black and brown (grey). The colour in either case is distributed in one of three very constant patterns; rats may be (*a*) self-coloured, with or without a small white mark on the chest; (*b*) coloured above and white below; (*c*) piebald, with coloured "hood" and back-stripe, elsewhere white. In inheritance, brown is dominant over black, and both over albino. Albinos may bear the black or brown determinant, as in mice, rabbits, &c. When a self-coloured rat is crossed with a piebald, the young have the intermediate pattern (*b*); this is a heterozygous form, and when two of this type are bred together they throw selfs, piebalds, and heterozygous young like themselves. Albinos can also bear pattern-determinants, so that an albino bearing "self" bred with a piebald throws heterozygous young of type (*b*). Self-coloured rats may be entirely coloured or may have a white mark on the chest, but since either form can throw the other, it appears that this is a fluctuating character, and that the pure "self" and white-marked form are not allelomorphic with one another.—A preliminary communication on the life-history of *Pleistophora periplanetae* (Lutz and Splendore): W. S. **Perrin.**—On the osmotic pressure of alcoholic solutions: P. S. **Barlow.**—Two wheels connected by an axle rolling on a rough horizontal plane: G. M. K. **Leggett.**—A series of optically active nitrogen compounds containing the allyl group: Miss M. B. **Thomas** and H. O. **Jones.** The investigation of the relation between the constitution and rotatory power of substituted ammonium ions is being continued. A series of five compounds containing the phenyl, methyl, and allyl groups, together with the ethyl, propyl, isopropyl, isobutyl, and isoamyl groups respectively, has been examined.

PARIS.

Academy of Sciences, December 11.—M. Troost in the chair.—On the distillation of gold, the alloys of gold with copper and tin, and on a new method of preparation of the purple of Cassius: Henri **Moissan.** Gold can be easily distilled in the electric furnace, its boiling point being higher than that of copper, but lower than that of lime. By condensation on a cold tube, the vapour is condensed partly in the form of moss gold, partly as microscopical crystals. The general properties of the condensed gold agree with those of finely divided gold. In the alloys of gold and copper, or gold and tin, the copper and tin distil before the gold. By distilling an alloy of tin and gold, a purple of Cassius is obtained in the dry way.—Nepheline syenites from the Los Islands (French Guinea): A. **Lacroix.** The various types of syenite in these islands are discussed in detail, and complete analyses are given for three typical specimens.—The habits of bees and the colours of flowers: Gaston **Bonnier.** According to the author, the contradictory experiments of various observers on the relations between bees and colour are due to a lack of knowledge of the habits of bees. There is a division of labour among the honey-fetching bees, the duty of those first issuing from the hive being to seek out honey, and not to fetch it. After a certain hour all the bees are engaged in fetching and carrying, and none in hunting for fresh sources of honey, and hence in selective experiments of this sort quite different results can be obtained according to the hour of the day fixed for the experiment. The author's own experiments lead to the conclusion that the bees are not influenced by colour in their search for honey.—Spectroscopic observations made during the eclipse of the sun of August 30, 1905: P.

Salet. The spectrum of the prominences showed lines characteristic of helium, coronium, hydrogen, cerium, titanium, calcium, and iron.—On the new Giacobini comet: M. **Giacobini.** Observations and elements of a comet discovered at Nice on December 6.—On the convergence of the regular continued fractions of the function $F(h,1,h',u)$: H. **Padé.**—On the problem of the motion of a homogeneous fluid ellipsoid all parts of which attract each other according to the law of Newton: W. **Stekloff.**—The theory of a solitary wave which is propagated along a horizontal elastic tube: A. **Boulanger.**—The evaluation of the magnifying power of microscopic objectives: L. **Malassez.**—On the co-existence of paramagnetism and diamagnetism in the same crystal: Georges **Meslin.** Experiments are described proving the existence of both para- and diamagnetism in the same crystal of pyrrhotine, and the continuous variation of the magnetic susceptibility with the direction.—The action of a magnetic field on the Goldstein rays (Canal-strahlen): Henri **Pellat.** Some curious and somewhat paradoxical experiments on the Goldstein rays are described. In magnetic fields of low intensity the rays behave exactly like positively charged particles. As the intensity approaches 1000 Gauss, the whole tube appears uniformly luminous, and if the magnetic field is still further increased, the luminosity contracts, but the deviation is in the opposite sense to that which is produced in magnetic fields of lower intensity. The author is at present unable to offer any explanation of the phenomenon.—A new arrangement for obtaining a monochromatic image of a source of light: Albert **Nodon.**—On the solution of platinum in sulphuric acid: Marcel **Delépine.** The action of sulphuric acid containing potassium sulphate upon platinum foil has been studied. The action increases with the amount of potassium sulphate present, probably on account of the higher boiling point of the mixture thus obtained. Ammonium sulphate reduces the solvent effect.—On two iodomercurates of lithium: A. **Duboin.**—On a new compound of fluorine and bromine: Paul **Lebeau.** Fluorine unites directly with bromine giving a compound BrF_3. This trifluoride, in which the bromine may be considered as trivalent, is a colourless liquid solidifying on cooling, and melting at 4° C. The chemical activity of this substance is very great, resembling that of fluorine.—Researches on the formation of metallic lustre on the surface of pottery: L. **Franchet.**—On the bromoborates of calcium: L. **Ouvrard.**—On the limiting states of some dissolved chromic salts: Albert **Colson.**—The action of phosphorus pentachloride on β-naphthol: E. **Berger.** Phosphorus pentachloride acting on β-naphthol at temperatures below 130° C. gives a good yield of the ether, $C_{10}H_7—O—C_{10}H_7$; at temperatures above 135° C. β-chlornaphthalene is formed. The yields are not high, but on account of the low prices of the materials it forms a good preparative method.—On some derivatives of anthracene octahydride and on the perhydride of anthracene: Marcel **Godchot.**—The synthesis of dihydrocamphoric acid: G. **Blanc.**—On acetylcyclohexanone: Georges **Leser.**—Anatomical and physiological modifications produced in certain tropical plants by a change of the place of growth: D. **Bois** and I. **Gallaud.** The necessity of taking into account the anatomical changes produced by a change in the environment of a plant is pointed out, and the errors in classification which may arise. The study of the factors producing these changes is also important in the acclimatisation of plants of commercial value.—Studies on the influence of light on the development of green plants, carbon dioxide being absent and amides added to the soil: Jules **Lefèvre.**—The granular eruptive rocks collected in Grahamsland by the Antarctic expedition of Dr. Charcot: Ernest **Gourdon.**—Exploration in eastern Africa: Maurice **de Rothschild.**—On crystallised hæmatin: MM. **Piettre** and **Vila.** Crystallised oxyhæmoglobin, from the horse, was split up into an albumenoid, globin, and crystallised hæmatin, the pigmented material of the blood, analyses of the latter being given and compared with earlier analyses of amorphous hæmatin of other observers.—The moderating action of catalase on the oxidations produced by extracts from animal tissues: F. **Battelli** and Mlle. L. **Stern.**—On some mineral compounds which behave like the liquefying diastase of malt: J. **Wolff.**—The diastatic hydrolysis of xylane: Gaston **Seillière.** In some molluscs and insect larvæ there exists a diastase capable of hydrolysing xylane to xylose, and for which the name of xylanase is proposed. It is probable that this substance plays an important part in the nutrition of these animals.—The geology of the eastern Pyrenees: Léon **Bertrand.**—On Fontaine-l'Evêque and the caverns of the plain of Canjuers: E. A. **Martel** and M. Le Couppey **de la Forest.**

DIARY OF SOCIETIES.

THURSDAY, DECEMBER 21.

LINNEAN SOCIETY, at 8.—Report on the Vienna Botanical Congress: Dr. A. B. Rendle.—*Cyrtandraceae malayanae novae*: Dr. Franz Kränzlin.—On Characæ from the Cape, collected by Major A. H. Wolley-Dod: H. and J. Groves.—Note on the Distribution of Shortia, Torr and Gray: B. Daydon Jackson.

CHEMICAL SOCIETY, at 8.30.—The Relation of Position Isomerism to Optical Activity. Part V. The Rotation of the Menthyl Esters of the Isomeric Dibromobenzoic Acids: J. B. Cohen and I. H. Zortman.—Azo-derivatives from α-Naphtho-methylcoumarin: J. T. Hewitt and H. V. Mitchell.—The Supposed Identity of Dihydrolaurolene and of Dihydro-*iso*laurolene with 1:1-Dimethylhexahydrobenzene: A. W. Crossley and N. Renouf.—The Slow Combustion of Carbon Disulphide: N. Smith.

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